### Oliver (U.S. Patent 5696671)

Oliver teaches using past or historical meteorological data ("a meteorological model") to 1) predict future evapotranspiration, and 2) make adjustments to watering schedules. The teachings are apparent from the following quotations:

- "If desired, ETo values for a particular site can be predicted based upon a meteorological model for that site." (Column 5, lines 45-6);

- "Past or historical meteorological data is used to make corrective adjustments to the watering schedules..." (Column 5, lines 61-62)).

- "...future predictions of ETo and/or precipitation values are used to determine when and how much to water." (Column 6, lines 9-10).
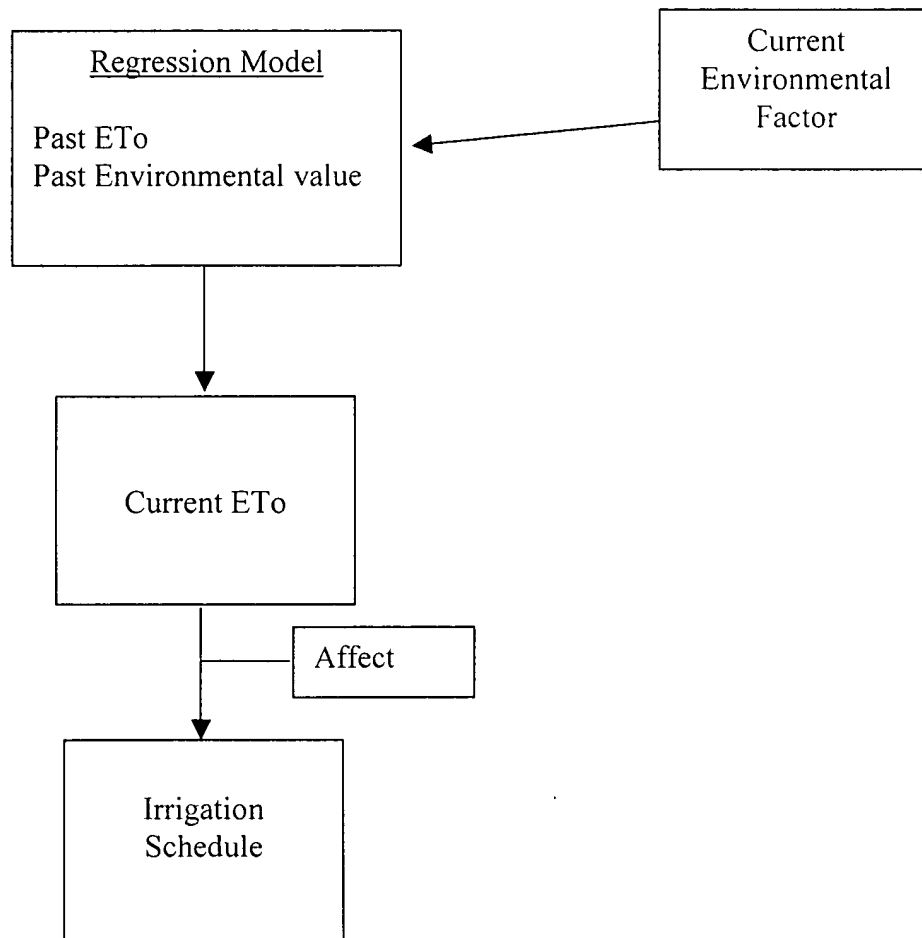
Oliver may be depicted as follows:
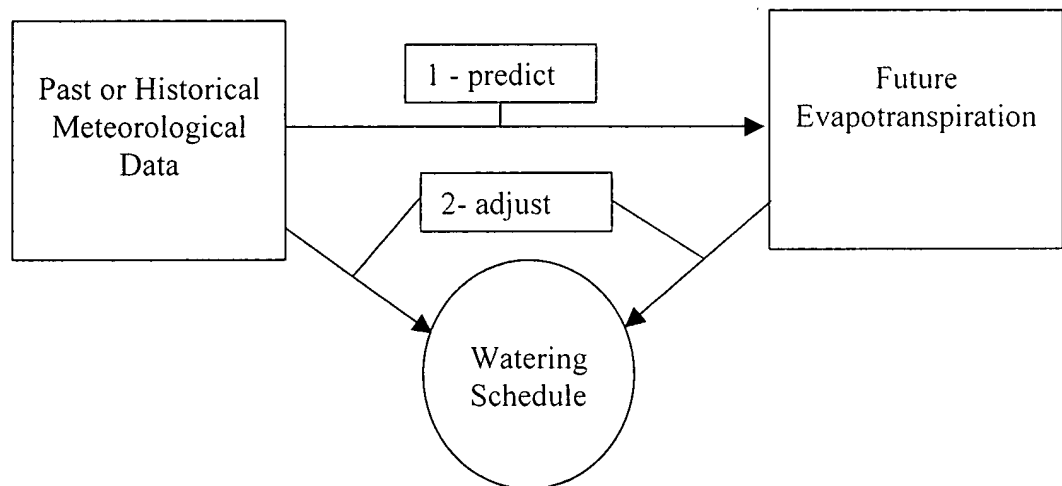
Overview of claim 1

Amended claim 1 requires a regression model that is "based upon a comparison of historical ETo values against corresponding historical environmental values" (Specification, Page 2, lines 28-29). A current value for an environmental factor is applied to the regression model to estimate a current ETo. (Claim 1, "applies a current value for an environmental factor to the regression model to estimate a current evapotranspiration rate (estimated ETo)"). The current ETo is then used to affect an irrigation schedule executed by the controller (Claim 1, "uses the

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estimated ETo to affect an irrigation schedule executed by the controller"). Claim 1 may be depicted as follows:

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┌─────────────────────────────┐          ┌──────────────────┐
│ Regression Model            │          │    Current       │
│                             │◄─────────│  Environmental   │
│ Past ETo                    │          │     Factor       │
│ Past Environmental value    │          └──────────────────┘
│                             │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│                             │
│    Current ETo              │
│                             │
└─────────────────────────────┘
              │         ┌──────────────┐
              ├─────────│   Affect     │
              │         └──────────────┘
              ▼
┌─────────────────────────────┐
│                             │
│    Irrigation               │
│    Schedule                 │
│                             │
└─────────────────────────────┘
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Novelty (35 USC §102)

The Office considers claims 1-15 to be anticipated by Oliver. The applicant disagrees, especially in view of the amendments contained herein.

> "A claim is anticipated only if each and every element as set forth in
> the claim is found, either expressly or inherently described, in a

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single prior art reference." *Verdegaal Bros. v. Union Oil Co. of
California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.
1987). (MPEP §2131).

Oliver cannot possibly anticipate claim 1 (and claims 2-15 by virtue of their dependence on claim 1) because Oliver fails to disclose the following recited elements:

"a regression model";

"a current value for an environmental factor";

applying "a current value for an environmental factor" to the regression model; and

"a current evapotranspiration rate".

The specification defines a regression model that is "based upon a comparison of historical ETo values against corresponding historical environmental values" (Specification, Page 2, lines 28-29). Oliver's model is not a regression model as defined by the specification because it only includes historical meteorological data, and there is no comparison disclosed.

Oliver may teach past and even future (predictive) environmental factors, but Oliver does not disclose a current environmental factor, much less applying a current environmental factor the regression model.

Oliver also fails to disclose current evapotranspiration amounts. The Examiner points out that Oliver <u>does disclose</u> prediction of future meteorological conditions on an hourly basis (column 5, lines 50-51). However, future conditions are not the same thing as current conditions.. "Current" implies calculation of ETo at an instant or the present time, not at a future time.

Based on the above analysis, Oliver lacks disclosure of each and every limitation of the claims as required by the MPEP §2131. Therefore, Oliver fails to anticipate claim 1. Claims 2-15 are not anticipated by virtue of their dependence on claim 1.

Inventive Step (35 USC §103)

The Office considers claims 1-15 to be obvious over Oliver. The applicant respectfully disagrees, especially in view of the amendments contained herein.

To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings (MPEP §2142).

Certainly Oliver fails to teach or suggest an irrigation controller having a regression model. Oliver also fails to motivate one of ordinary skill to place a regression model in an irrigation controller because Oliver apparently does just fine with its own method of making future predictions based on a weighted averages.

Oliver also fails to teach, suggest, or motivate one of ordinary skill to use "current" values in the calculations, much less applying "a current value to the regression model". For example, applying "a current value for an environmental factor" may be exemplified by determining a current temperature then applying that temperature to the regression model. There is certainly no teaching, suggestion, or motivation within Oliver to take a current temperature or any other current environmental factor. Quite to the contrary, Oliver teaches making predictions of future values based on past values. Making these predictions "on an hourly basis" concerns only the frequency of the predictions. A current environmental factor is not a prediction based on the past. Consequently, Oliver does not suggest or motivate the limitation of applying a current value to the regression model.

Moreover, Oliver also fails to teach, suggest, or motivate one of ordinary skill to use a "current" ETo value. Oliver is based on using predictive or future evapotranspiration rates to adjust a watering schedule. Apparently, Oliver calculates a cumulative depletion level of water in the soil ("That is, as each day becomes past or historical, adjustments to the overall cumulative depletion of water in the soil need to be made." Column 5, lines 63-65). One of ordinary skill in the art would not be motivated to include a "current" evapotranspiration rate since Oliver uses predictive ETo to affect the cumulative depletion level ("If the predicted ETo was lower than the actual ETo value, the cumulative depletion value would be increased" Column 6, lines 26-28).

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Using a current ETo would produce different results in the calculation of the cumulative depletion level.

Based on the preceding analysis, Oliver fails to teach, suggest or motivate one of ordinary skill in the art to modify the reference to include at least three of the limitations of claim 1. Thus, claim 1 (and claims 2-15 by virtue of their dependence) is not obvious over Oliver.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1.   (Amended) An irrigation controller comprising:

a memory that stores a regression model;

a microprocessor that applies a <u>current</u> value for an environmental factor to the regression model to estimate a current evapotranspiration rate (estimated ETo); and

a mechanism that uses the estimated ETo to affect an irrigation schedule executed by the controller.

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